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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/789,243	02/28/2004	Jun Yang	P0003/7001	8980
21127	7590	10/31/2005	EXAMINER	
KUDIRKA & JOBSE, LLP ONE STATE STREET SUITE 800 BOSTON, MA 02109			FAULK, DEVONA E	
			ART UNIT	PAPER NUMBER
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DATE MAILED: 10/31/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<p align="center">Office Action Summary</p>	Application No. 10/789,243	Applicant(s) YANG ET AL	
	Examiner Devona E. Faulk	Art Unit 2644	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 86-95 and 107-109 is/are pending in the application.
- 4a) Of the above claim(s) 96-106 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 86-95 and 107-109 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

AM

DETAILED ACTION

1. The applicant's preliminary amendment was received and entered. Claims 1-85 were cancelled.

Election/Restrictions

2. During a telephone conversation with on 10/26/2005 with Therese A. Hendricks (Reg. No. 30,389), a provisional election was made without traverse to prosecute the invention of processing an audio signal according to claim 93. Affirmation of this election must be made by applicant in replying to this Office action. Claims 96-106 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
4. **Claims 91 and 108** recite the limitation "said means" in line 2. **Claim 107** recites "said means" in line 7. There is insufficient antecedent basis for this limitation in the claim.
5. **Claims 91, 107, 108** rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 91, 107 and 108 all recite "said means for

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generating to steer". The recited claim language is indefinite because it is unclear what is meant by said means and what is being generated.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. **Claim 86,90 and 91** are rejected under 35 U.S.C. 102(b) as being anticipated by Pompei (EP 0 973 152 A2).

Regarding **claim 86**, Pompei discloses a method for steering a directional audio beam that is self-demodulated from an ultrasound carrier (abstract; Figure 1), said method including the steps of:

generating an audio signal (20₁, audio source, Figure 1);
generating an ultrasound carrier signal (18, carrier generator, Figure 1);
modulating said carrier signal with said audio signal (26, modulator, Figure 1);
adjusting both amplitude and phase of at least one of said audio signal and said carrier signal to steer said audio beam to a desired direction(page 3, lines 52-56); and
generating an ultrasound beam driven in said direction by said modulated carrier signal (abstract).

Regarding **claim 90**, Pompei as modified by Lu discloses wherein said step of generating an ultrasound beam includes driving a plurality of ultrasound transducer

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elements via a corresponding plurality of matching filters adapted to adjust the phase of the modulated carrier signal to the resonant frequency of the associated transducer element (Pompei, Figures 5 and 11, page 5, paragraph 0029, lines 29-34; page 9 paragraph 0061).

Regarding **claim 91**, Pompei discloses detecting the location of a potential listener and adjusting said means for generating to steer said audio beam back towards said location (Pompei, page 6, paragraph 0054, lines 45-50; page 9, paragraph 0063).

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. **Claim 87** is rejected under 35 U.S.C. 103(a) as being unpatentable over Pompei (EP 0 973 152 A2) in view of Hussain et al. (US 5,911,692).

Regarding **claim 87**, Pompei fails to disclose but Hussain teaches of suppressing a sidelobe of an ultrasonic beam (See abstract). It would have been obvious to modify Pompei by suppressing a sidelobe of an ultrasonic beam as taught by Hussain in order to enable thinning (column 8, line 66-column 9, line 3).

10. **Claim 88** is rejected under 35 U.S.C. 103(a) as being unpatentable over Pompei (EP 0 973 152 A2) in view of Lu et al. (US 5,081,995).

Regarding **claim 88**, Pompei fails to disclose but Lu teaches of weighting an audio or carrier signal by a zeroth order Bessel function to synthesize a Bessel distribution source (Figure 7; column 4, lines 15-34). It would have been obvious to modify Pompei by weighting an audio or carrier signal by a zeroth order Bessel function as taught by Lu in order to produce a non-diffracting Bessel function, deep depth of field (column 4, lines 45-48; column 8, lines 22-24).

Regarding **claim 89**, Pompei as modified by Lu discloses wherein said step of generating an ultrasound beam includes driving a plurality of ultrasound transducer elements with said modulated carrier signal and said step of weighting includes adjusting gain and delay of said audio and/or carrier signal prior to driving each transducer element (Pompei teaches of a generating an ultrasound beam including driving a plurality of ultrasonic transducer elements (Figure 1) and Lu teaches of adjusting gain and delay; column 7, lines 37-47).

11. **Claim 92** is rejected under 35 U.S.C. 103(a) as being unpatentable over Pompei (EP 0 973 152 A2) in view of Zhang (US Patent Application 2003/0223554).

Regarding **claim 92**, Pompei fails to disclose but Zhang teaches of reflecting an audio beam from an intermediate surface such as a billboard panel (Figure 3, billboard ,600", page 2, paragraph 0039; page 3, paragraph 0041). Pompei teaches of various uses of the system including projecting sound to persons in a public setting (page 9, paragraph 0063). It would have been obvious to modify Pompei to reflect an audio beam from a billboard as taught by Zhang in order to relay information to specific area with minimal interference (Zhang, paragraph 0041).

12. **Claim 107** is rejected under 35 U.S.C. 103(a) as being unpatentable over Pompei (EP 0 973 152 A2) in view of Cerofolini (US 5,740,804).

Regarding **claim 107**, Pompei discloses a method for steering a directional audio beam that is self-demodulated from an ultrasound carrier (abstract; Figure 1), said method including the steps of:

- generating an audio signal (20₁, audio source, Figure 1);
- generating an ultrasound carrier signal (18, carrier generator, Figure 1);
- modulating said carrier signal with said audio signal (26, modulator, Figure 1);
- generating an ultrasound beam driven by said modulated carrier signal (abstract); and

- adjusting said means for generating to steer said audio beam to a desired direction(page 3, lines 52-56);

- wherein said step of generating is performed by means of a plurality of transducer elements (Figure 1).

Pompei fails to disclose but Cerofolini teaches of adjusting by means of a stepper motor for rotating transducer elements relative to at least one axis (abstract). It would have been obvious to modify Pompei to adjust using a stepper motor as taught by Cerofolini in order to produce a panoramic image along the area of interest.

Regarding **claim 108**, Pompei as modified by Cerofolin disclose including detecting the location of a potential listener and adjusting said means for generating to steer said audio beam back towards said location (Pompei, page 6, paragraph 0054, lines 45-50; page 9, paragraph 0063).

13. **Claim 109** is rejected under 35 U.S.C. 103(a) as being unpatentable over Pompei (EP 0 973 152 A2) in view of Cerofolini (US 5,740,804) in further view of Zhang (US Patent Application 2003/0223554).

Regarding **claim 109**, Pompei as modified by Cerofolini fails to disclose but Zhang teaches of reflecting an audio beam from an intermediate surface such as a billboard panel (Figure 3, billboard ,600", page 2, paragraph 0039; page 3, paragraph 0041). Pompei teaches of various uses of the system including projecting sound to persons in a public setting (page 9, paragraph 0063). It would have been obvious to modify Pompei to reflect an audio beam from a billboard as taught by Zhang in order to relay information to specific area with minimal interference (Zhang, paragraph 0041).

Allowable Subject Matter

14. **Claims 93-95** are allowed.

15. The following is an examiner's statement of reasons for allowance:

Regarding claim 93, prior art Pompei (EP 0 973 152 A2)discloses a method for steering a directional audio beam that is self-demodulated from an ultrasound carrier (abstract; Figure 1). Prior art Pompei (EP 0 973 152 A3) discloses a parametric audio system. Prior art Pompei (WO 01/52437 A1) discloses a parametric audio system. Prior art Redding (GB 2 121 174 A) discloses measurement of distance using ultrasound. The prior art or combination thereof fails to disclose or make obvious performing a square root operation on the audio signal to generate a square rooted signal; alternating

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the gain of the square rooted signal between positive and negative gain values at selective locations to generate a flipped signal, wherein the selected locations of the signal are minimum turning points of the signal; modulating the flipped signal onto a first ultrasonic carrier wave; and offsetting the audio signal by a predetermined amount prior to performing the square root operation to ensure that the square root operation only results in real values. Therefore the prior art or combination thereof fails to disclose or make obvious a method of processing an audio signal as claimed.

Claims 94 and 95 are allowed due to their dependency on claim 93.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Devona E. Faulk whose telephone number is 571-272-7515. The examiner can normally be reached on 8 am - 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sinh Tran can be reached on 571-272-7564. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DEF



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